

The opinion in support of the decision being entered today
is *not* binding precedent of the Board

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GREGG S. GOYINS and ROBERT J. LAWTON

Appeal 2007-1732
Application 09/497,021¹
Technology Center 2600

Decided: September 24, 2007

Before: MAHSHID D. SAADAT, JAY P. LUCAS, and MARC S. HOFF,
Administrative Patent Judges.

HOFF, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF CASE

Appellants appeal under 35 U.S.C. § 134 from a Final Rejection of
claims 1-28. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

¹ Application filed February 1, 2000. The real party in interest is Hewlett-Packard Development Company, L.P.

Appellants' invention relates to switchable polarizers for optical projection (LCD) displays. One embodiment includes two conductive electrodes and a liquid crystal material between them. The electrodes apply a uniform electric field across the liquid crystal material. The electrodes can also heat the liquid crystal material precisely, which in turn provides precise control of the polarization of light passing through the material.

Claims 1 and 13 are exemplary:

1. A switchable polarizer for optical projection displays, said [switchable polarizer²] comprising:

- a first electrode having a first set of contacts;
- a second electrode having a second set of contacts; and
- a layer of liquid crystal material positioned between the first and second electrode

wherein the first electrode conducts current between said first set of contacts to heat the polarizer, and wherein the second electrode conducts current between said second set contacts to heat the polarizer.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

| | | |
|-------------|--------------|---------------|
| Giallorenzi | US 3,963,310 | Jun. 15, 1976 |
| Kato | US 4,603,946 | Aug. 5, 1986 |
| Ando | US 4,692,779 | Sep. 8, 1987 |
| Franklin | US 4,723,835 | Feb. 9, 1988 |
| Kahn | US 4,799,770 | Jan. 24, 1989 |
| Andersson | US 6,130,731 | Oct. 10, 2000 |

² These words are missing from the claim on appeal. Should the claim be allowed, these words should be added for proper antecedent basis.

Claims 1, 11, 20 and 24-28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kahn.

Claims 13, 14 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Franklin.

Claims 1-10 and 20-22 stand rejected under 35 U.S.C. § 103(a) as being obvious over Franklin in view of Ando.

Claims 15 and 23 stand rejected under 35 U.S.C. § 103(a) as being obvious over Franklin in view of Ando and Kato.

Claims 17-19 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kahn in view of Franklin and Kato.

Claim 12 stands rejected under 35 U.S.C. § 103(a) as being obvious over Franklin in view of Ando and Andersson.

Claim 12 also stands rejected under 35 U.S.C. § 103(a) as being obvious over Kahn in view of Andersson.

Claim 24 stands rejected under 35 U.S.C. § 103(a) as being obvious over Franklin in view of Giallorenzi.

Appellants contend that the Examiner erred because (1) Kahn does not teach a layer of liquid crystal material between first and second electrodes, each electrode having a set of contacts; (2) Franklin does not teach drawing equal currents through first and second electrodes, so as to drive a switchable polarizer in a mode in which the currents heat the liquid crystal material; and (3) the proposed combination of Kahn and Franklin is improper, because the proposed modification of Kahn would ruin the LCD device by causing electroplating (Br. 17:4). The Examiner contends that the Kahn and Franklin references properly teach the respective limitations.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Briefs and the Answer for their respective details. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants could have made but chose not to make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004).³

ISSUES

There are two principal issues in the appeal before us.

The first issue is whether the Examiner erred in holding that Kahn teaches a layer of liquid crystal material positioned between first and second electrodes (each electrode having a set of contacts).

The second issue is whether the Examiner erred in holding that Franklin teaches driving a switchable polarizer in a mode in which first and second electrodes heat the liquid crystal material.

FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

The Invention

1. Appellants invented a switchable polarizer for optical projection (LCD) displays (Specification 4:2-3).

³ Appellants have not presented any substantive arguments directed separately to the patentability of the dependent claims or related claims in each group, except as will be noted in this opinion. In the absence of a separate argument with respect to those claims, they stand or fall with the representative independent claim. *See In re Young*, 927 F.2d 588, 590, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991). *See also* 37 C.F.R. § 41.37(c)(1)(vii).

2. One embodiment includes two conductive electrodes, each having a set of contacts, and a liquid crystal material disposed between them (Specification 4:3-5).

3. The electrodes apply a uniform electric field across the liquid crystal material due to a potential difference between them (Specification 4:6-8).

4. In a heating mode, equal currents are passed through the two electrodes in order to heat the liquid crystal material precisely, which in turn provides precise control of the rotation of the nematic molecules of the material, resulting in precise control of the polarization of light passing through the material (Specification 2:5-8, 4:9-11, 10:20-23).

Kahn

5. Kahn teaches a liquid crystal cell for an image projection apparatus having a liquid crystal layer sandwiched between two conductive layers (Abstract).

6. Kahn teaches driving a switchable polarizer in one of two modes (heating and non-heating)(col. 5, l. 61 to col. 6, l. 1).

7. Kahn teaches six mutually parallel busbars 35-1 to 35-6, bonded to reflective layer 26, which serve as electrodes (col. 5, ll. 45-46).

8. Figure 3 of Kahn is disclosed as a sectional plan view taken along the line 3-3 of Figure 2 (col. 5, ll. 39-41).

9. A desired potential difference can be applied between any pair of the busbars (col. 5, ll. 58-59).

10. The busbars of Kahn are “in contact” with the appropriate liquid crystal region “24-1” to “24-4” (*sic*, 20-1 to 20-4)(col. 5, ll. 46-51).

11. Liquid crystal molecules in a region (any of regions 20-1 to 20-4) may be heated by applying a voltage difference between mutually adjacent busbars (col. 5, l. 61 to col. 6, l. 1; see Fig. 3).

12. Kahn teaches first and second current sources switchably coupled to first and second electrodes, respectively (see Fig. 3: for example, AC sources in the upper left and upper right, coupled to busbars 35-1, 35-2).

13. Kahn includes a set of switches that selectively enable current to flow through the set of electrodes (Fig. 3: each AC source has an associated switch illustrated).

14. Kahn teaches drawing equal currents through a pair of electrodes during the heating mode (see Fig. 3: for example, when the upper left switch is closed, an (equal) current flows through busbars 35-1, 35-2).

15. Kahn teaches applying a first voltage signal to a first electrode, and a second voltage signal to a second electrode (see Fig. 3: busbar 35-1 is connected to 'positive' terminal of the upper left AC source, and busbar 35-2 is connected to the 'negative' terminal, and/or connected to the 'positive' terminal of the upper right AC source).

Franklin

16. Franklin teaches a heater control circuit for the integral heater of a liquid crystal display (Abstract).

17. Franklin teaches front electrodes 13 and rear electrodes 17 (Figs. 1-3; col. 3, ll. 31-52).

18. Connecting a source of AC potential between front and rear electrodes causes a change in the orientation of the nematic molecules of the liquid crystal fluid (col. 4, ll. 14-21).

19. To heat its liquid crystal material, Franklin includes a single integral LCD heater (19), which is not also used for controlling polarization states (col. 5, ll. 24-53).

Kato

20. Kato teaches a view mirror for a motor vehicle, having liquid crystal material encapsulated therein (col. 3, ll. 25-27).

21. Kato's control circuit includes two operational amplifiers (Fig. 4: 27, 29) connected to respective first and second electrodes (1a, 2a).

PRINCIPLES OF LAW

Anticipation is established when a single prior art reference discloses expressly or under the principles of inherency each and every limitation of the claimed invention. *Atlas Powder Co. v. IRECO Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1946 (Fed. Cir. 1999); *In re Paulsen*, 30 F.3d 1475, 1478-79, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994).

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007) (*citing In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellant. *Piasecki*, 745 F.2d at 1472, 223 USPQ at 788. Thus, the Examiner must not only assure that the requisite findings are made, based on evidence of record, but

must also explain the reasoning by which the findings are deemed to support the Examiner's conclusion.

The determination of obviousness must consider, *inter alia*, whether a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention and whether there would have been a reasonable expectation of success in doing so. *Brown & Williamson Tobacco Corp. v. Philip Morris, Inc.*, 229 F.3d 1120, 1124, 56 USPQ2d 1456, 1458-59 (Fed. Cir. 2000). *Medichem S.A. v. Rolabo S.L.*, 437 F.3d 1157, 1164, 77, USPQ2d 1865, 1869 (Fed. Cir. 2006). Where the teachings of two or more prior art references conflict, the examiner must weigh the power of each reference to suggest solutions to one of ordinary skill in the art, considering the degree to which one reference might accurately discredit another. *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991). If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

ANALYSIS

1. Rejection of claims 1, 11, 20 and 24-28 as anticipated by Kahn

With respect to claim 1, Appellants argue that the Examiner erred in rejecting the claims under 35 U.S.C. § 102(b) because Kahn does not teach a first electrode having a first set of contacts, a second electrode having a second set of contacts, *and* a layer of liquid crystal material positioned between the first and second electrodes (Br. 6:21-23). We agree with Appellants.

Kahn teaches six mutually parallel busbars 35-1 to 35-6, bonded to reflective layer 26, which serve as electrodes (FF 7). Kahn teaches that a desired potential difference can be applied between any pair of the busbars (FF 9) and that liquid crystal molecules in a region (e.g., region 20-1) may be heated by applying a voltage difference between mutually adjacent busbars (FF 11). Further, as noted above, Kahn only teaches applying a potential difference between one pair of busbars (FF 9), each being an electrode required to have a set of contacts, as claimed by Appellants. As such, taking each of the busbars 35-1 to 35-6 to be an electrode, neither one is shown to have a set of contacts such that current is conducted through the electrode between the contacts. Kahn therefore fails to teach conducting current between the first set of contacts and conducting current between the second set of contacts in each of the first and second electrodes. Because Kahn does not meet every limitation of claim 1, (or claim 11 dependent therefrom), the Examiner's anticipation rejection is deemed erroneous.

Appellants argue that the busbars of Kahn do not have a liquid crystal material layer positioned therebetween (Br. 6:21-23). Appellants argue that the busbars 35-1 to 35-6 are "part of reflective layer 26 – a layer separate from liquid crystal layer 20," and that Figure 3 of Kahn depicts the busbars "in a layer above the liquid crystal layer," "coplanar in a plane separate from the plane defined by layer 20." It is important to note that Figure 3 is disclosed as a sectional plan view taken along the line 3-3 of Figure 2 (FF 8). Figure 3, therefore, is a depiction of *coplanar* elements, including busbars 35-*n* and liquid crystal material 20. It is further noted that the busbars are disclosed as being "in contact" with the appropriate liquid

crystal region 24-1 to 24-4 (*sic*, 20-1 through 20-4)(FF 10). In order to heat a liquid crystal material region, a voltage difference is applied between an appropriate pair of mutually adjacent busbars (FF 11). If we were to accept Appellants' description of the arrangement of the busbars and liquid crystal material of Kahn, busbars 35-1, 35-3, 35-4, and 35-6 would be aligned, coplanar, in a plane separate from that of layer 20, and would contact layer 20 only corner-to-corner, since these busbars are positioned outside the boundary of layer 20 (see Fig. 3). Such corner-to-corner alignment is inconsistent with the disclosed use of the busbars to pass current through the liquid crystal material 20. Taking the arrangement shown in Figure 3 together with the written description of Kahn, however, we are persuaded that the busbars 35-*n* are bonded to layer 26, but actually lie in the same plane as layer 20, with busbars 35-2 and 35-5 positioned in the center of layer 20, and busbars 35-1, 35-3, 35-4 and 35-6 positioned "outboard" of the remainder of layer 20.

Applying that understanding of Kahn to the limitations of claim 20, because we interpret Kahn to mean that the busbars 35-*n* lie in the same plane as liquid crystal layer 20, we find that Kahn teaches a set of electrodes arranged in two layers (e.g., 35-1, 35-2), a layer of liquid crystal material (e.g., 20-1) positioned between the two layers of the set of electrodes, wherein the set of electrodes are operable to control polarization states of the liquid crystal material and operable to conduct sufficient current to control a temperature of said layer (col. 5, l. 61 – col. 6, l. 1). We therefore find that the Examiner did not err in rejecting claim 20 as being anticipated by Kahn.

The limitations of claim 24 are very similar to those of claim 20. We therefore also find that the Examiner did not err in rejecting claim 24 as being anticipated by Kahn. We affirm the rejection of dependent claims 25-28 as well, as Appellants presented no separate argument directed to the limitations of these claims.

2. Rejection of claims 13, 14 and 16 as anticipated by Franklin

With respect to claim 13, Appellants argue that the Examiner erred in rejecting the claims under 35 U.S.C. § 102(b), because Franklin does not teach a driving mode in which first and second electrodes heat the liquid crystal material. We agree with Appellants.

Franklin teaches front electrodes 13 and rear electrodes 17 (FF 17). Connecting a source of AC potential between them causes a change in the orientation of the nematic molecules of the liquid crystal fluid (FF 18). Franklin does not disclose passing current through first and second electrodes in order to heat the liquid crystal material. Rather, Franklin includes a single integral LCD heater, which is not also used for controlling polarization states (FF 19), and Franklin's invention is directed to an apparatus for controlling that heater (col. 5, ll. 24-53 et seq.). As a result, we find that the Examiner's anticipation rejection is erroneous.

3. Rejection of Claims 1-10 and 20-22 as obvious over Franklin in view of Ando

With respect to claims 1 and 20, Appellants argue that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a), because neither Franklin nor Ando teaches a layer of liquid crystal material positioned

between two layers of a set of electrodes, said electrodes operable to conduct sufficient current to control the temperature of the layer of liquid crystal material. We agree with Appellants.

As noted *supra*, Franklin does not disclose passing current through electrodes in order to heat the liquid crystal material. Ando likewise fails to meet this claim limitation. Because neither reference employs the same electrodes to both heat its liquid crystal material and control polarization states, the Examiner's obviousness rejection is erroneous.

4. Rejection of claims 15 and 23 as obvious over Franklin in view of Ando and Kato

Appellants argue that claims 15 and 23, dependent from parent claims 13 and 20 respectively, are patentable because Franklin alone (claim 13) or Franklin in view of Ando (claim 20) does not teach the limitations of the parent claims. As noted *supra*, we agree with Appellants, and find that the Examiner's obviousness rejection of claims 15 and 23 is erroneous.

5. Rejection of claims 17-19 as obvious over Kahn in view of Franklin and Kato

With respect to claim 17, Appellants argue that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a), because none of Kahn, Franklin and Kato teaches a layer of liquid crystal material positioned between first and second electrodes, nor two current sources drawing *equal* currents through respective first and second electrodes. We do not agree with Appellants.

Kahn teaches first and second electrodes receiving respective, different driving signals (FF 15); a layer of liquid crystal material (20-1)

positioned between the first and second electrodes⁴; and first and second current sources switchably coupled to the first and second electrodes respectively (FF 12, 13); the second current being equal in magnitude to the first current (FF 14). Kahn does not teach a buffer circuit applying driving voltage signals to first and second electrodes. Kato teaches an LCD device including operational amplifiers being connected to first and second electrodes (FF 21). We agree with the Examiner that it would have been obvious to the person having ordinary skill in the art to modify Kahn to include a buffer circuit, such as the amplifiers of Kato, because such a circuit provides the ability to increase original input signal levels to a desired level as well as the ability to “sustain” current through the electrodes. We therefore agree with the Examiner that the combination of Kahn, Franklin and Kato meets the invention recited in claim 17. The rejections of claims 18 and 19, not separately argued by Appellants, are also affirmed.

6. Rejection of claim 12 as obvious over Franklin in view of Ando and Andersson

As noted *supra*, the combination of Franklin and Ando does not teach all the limitations of claim 1, from which claim 12 depends. Andersson does not supply the teachings lacking from the Franklin and Ando references. We therefore find that the Examiner’s obviousness rejection is in error.

⁴ Note *supra* our opinion that the busbars and liquid crystal material of Kahn are coplanar, and therefore that the liquid crystal material is disposed between the busbars.

7. Rejection of claim 12 as obvious over Kahn in view of Andersson

As noted *supra*, Kahn does not teach all the limitations of claim 1. Andersson does not supply the teachings missing from Kahn. We therefore find that the Examiner's obviousness rejection is in error.

8. Rejection of claim 24 as obvious over Franklin in view of Giallorenzi

With respect to claim 24, Appellants argue that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a), because neither Franklin nor Giallorenzi teaches driving a set of electrodes to cause current to flow through said set of electrodes to sufficiently heat a liquid crystal layer of a liquid crystal polarizer to control a temperature of the liquid crystal layer, wherein the set of electrodes is arranged in two layers surrounding said liquid crystal layer. We agree with Appellants. As noted *supra*, Franklin does not disclose passing current through electrodes in order to heat the liquid crystal material.

Because Appellants have shown that the Examiner's asserted rejections of claims 1-16 and 21-23 are erroneous, we reverse the Examiner's rejections of claims 1-16 and 21-23. We affirm the rejections of claim 17-20 and 24-28.

Rejection of claims 13, 14, 16, and 21-23 under 37 C.F.R. § 41.50(b)

We make the following new grounds of rejection using our authority under 37 C.F.R. § 41.50(b).

Claims 13, 14, 16, 21, and 22 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kahn.

With reference to claim 13, Kahn teaches driving a switchable polarizer in one of two modes (heating and non-heating)(FF 6), the polarizer having first and second electrodes (FF 7; e.g., 35-1 and 35-2) and a liquid crystal material (e.g. 20-1) between the electrodes⁵, including drawing equal currents through the electrodes during the heating mode (FF 14), and applying a first voltage signal to the first electrode and a second voltage signal to the second electrode (FF 15).

With respect to claim 14, Kahn further teaches that the drawing of currents through the electrodes includes coupling the electrodes to two current sources (FF 12). With respect to claim 16, as noted *supra*, the first and second voltage signals applied are alternating signals (FF 12, 15).

With respect to claim 21, dependent from claim 20, Kahn further teaches that each set of electrodes includes a first and second contact (FF 9; for example, busbars 35-1 and 35-2).

With respect to claim 22, Kahn includes a set of switches that selectively enable current to flow through the set of electrodes (FF 13).

Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kahn in view of Kato.

⁵ Note *supra* our opinion that the busbars and liquid crystal material of Kahn are coplanar, and therefore that the liquid crystal material is disposed between the busbars.

As noted *supra*, we affirm the rejection of parent claim 20 as anticipated by Kahn. Kahn does not teach a set of amplifiers that supply current to the set of electrodes. Kato teaches an LCD device including operational amplifiers being connected to first and second electrodes (FF 21). We agree with the Examiner that it would have been obvious to the person having ordinary skill in the art to modify Kahn to include a set of amplifiers such as taught by Kato, because the amplifiers provide the ability to increase original input signal levels to a desired level, as well as the ability to supply current to the set of electrodes.

CONCLUSION OF LAW

We conclude that Appellants have not shown that the Examiner erred in rejecting claims 17-20 and 24-28. Claims 17-20 and 24-28 are not patentable. We conclude that Appellants have shown the Examiner erred in rejecting claims 1-16 and 21-23. On the record before us, Claims 1-16 and 21-23 have not been shown to be unpatentable.

DECISION

The Examiner's rejection of claims 1-16 and 21-23 is reversed. The Examiner's rejection of claims 17-20 and 24-28 is affirmed.

We have entered a new ground of rejection against claims 13, 14, 16, and 21-23 under 37 C.F.R. § 41.50(b).

37 C.F.R. § 41.50(b) provides that, "[a] new grounds of rejection pursuant to this paragraph shall not be considered final for judicial review."

37 C.F.R. § 41.50(b) also provides that the Appellant, *WITHIN TWO MONTHS FROM THE DATE OF THE DECISION*, must exercise one of the following two options with respect to the new grounds of rejection to avoid termination of proceedings (37 C.F.R. § 1.197 (b) as to the rejected claims:

(1) Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner ...

(2) Request that the proceeding be reheard under 37 C.F.R. § 41.52 by the Board upon the same record ...

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

Appeal 2007-1732
Application 09/497,021

AFFIRMED-IN-PART

37 C.F.R. § 41.50(b)

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HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS CO 80527-2400